



PATENT APPLICATION  
Docket No: 14321.59

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of )  
Shin Kamei et al. )  
Serial No.: 10/715,146 ) Art Unit  
Filed: November 17, 2003 ) 2874  
Confirmation No.: 1904 )  
For: OPTICAL WAVEGUIDE CIRCUIT )

CERTIFICATE OF DEPOSIT UNDER 37 C.F.R. § 1.8

I hereby certify that the following documents are being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450, on the 12<sup>th</sup> day of March 2004.

- Transmittal for Information Disclosure Statement (3 pages)
- Information Disclosure Statement (3 pages)
- Form PTO-1449 listing 13 references (2 pages)
- A copy of 11 of the references list on the Form PTO-1449
- Postcard

Respectfully submitted,

DANA L. TANGREN  
Attorney for Applicant  
Registration No. 37,246  
Customer No. 022913

RICK D. NYDEGGER  
BRENT P. LORIMER  
THOMAS R. VUKSINICK  
LARRY R. LAYCOCK  
JONATHAN W. RICHARDS  
DAVID R. WRIGHT  
JOHN C. STRINGHAM  
JOHN M. GUYNN  
CHARLES L. ROBERTS  
DANA L. TANGREN  
ERIC L. MASCHOFF  
CHARLES J. VEVERKA  
ROBYN L. PHILLIPS  
RICHARD C. GILMORE \*  
STERLING A. BRENNAN \*  
R. BURNS ISRAELSEN  
DAVID R. TODD  
GREGORY M. TAYLOR  
DAVID B. DELLENBACH  
L. DAVID GRIFFIN  
ADRIAN J. LEE  
FRASER D. ROY  
CARL T. REED



R. PARRISH FREEMAN, JR.  
PETER F. MALEN, JR.  
L. REX SEARS, PH.D.  
WILLIAM R. RICHTER  
ERIC M. KAMERATH  
ROBERT E. AYCOCK  
JENS C. JENKINS  
KEVIN W. STINGER  
WILLIAM J. ATHAY  
MICHAEL B. DODD  
RYAN D. BENSON  
SARA D. JONES  
TIGE KELLER  
JANNA L. JENSEN  
MATTHEW D. TODD  
J. LAVAR OLDHAM  
MICHAEL J. FRODSHAM  
JOSEPH L. KRUPA  
BRETT A. HANSEN  
BRETT I. JOHNSON  
MATTHEW A. BARLOW  
WESLEY C. ROSANDER  
ANDREW S. HANSEN  
CHAD E. NYDEGGER  
JOSEPH G. PIA  
CLINTON E. DUKE  
DAVID J. LORENZ †

# WORKMAN | NYDEGGER

INTELLECTUAL PROPERTY ATTORNEYS

1000 EAGLE GATE TOWER  
60 EAST SOUTH TEMPLE  
SALT LAKE CITY, UTAH 84111  
TELEPHONE: (801) 533-9800  
FAX: (801) 328-1707  
WEBSITE: HTTP://WWW.WNLAW.COM



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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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For: OPTICAL WAVEGUIDE CIRCUIT )

### TRANSMITTAL FOR INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing and pursuant to 37 C.F.R. § 1.97 is an Information Disclosure Statement, which includes the following statements, if any, required variously by 37 C.F.R. § 1.98:

- ☒ Statement of relevance of selected cited references not in the English language which are not translated.
- ☐ Statement that selected cited references are substantially cumulative of an enclosed or previously submitted reference.
- ☐ Statement that selected cited references were previously cited by or submitted to the United States Patent and Trademark Office in a prior application which is relied upon for an earlier filing date under 35 U.S.C. § 120.

\* Admitted only in California

† Admitted only in New York

A. Additional Materials Required Due to Content of Information Disclosure Statement

Transmitted are the following documents in addition to the Information Disclosure Statement as required variously under 37 C.F.R. § 1.98:

- ☒ Form PTO-1449 listing 13 references submitted for consideration.
- ☒ A copy of 11 of the references listed on the Form PTO-1449.
- ☒ English translations of one (1) of the references listed on the Form PTO-1449 which are not in the English language.
- ☐ Copies of the following documents from the prosecution of a previous, related application:
  - ☐ Form PTO-1449 AND INFORMATION DISCLOSURE STATEMENT;  
and
  - ☐ Form PTO-892

B. Additional Materials Required Due to Timing of Filing of Information Disclosure Statement

The transmitted Information Disclosure Statement is being filed within one (1) of the following four (4) time periods:

- I. ☒ Prior to the later of either three (3) months following the filing date or the mailing of a first Office Action. Accordingly, no materials other than those listed above are enclosed.
- II. ☐ Following the latter of either three (3) months following the filing date or the mailing of a first Office Action, but before the mailing of a final Office Action or a Notice of Allowance. Accordingly, to secure consideration thereof, one (1) of the following is also enclosed:
  - ☐ Promptness Certification; or
  - ☐ Check No. \_\_\_\_\_ in the amount of \$\_\_\_ constituting the submission fee set forth in 37 C.F.R. § 1.17(p).
- III. ☐ After the mailing of a Notice of Allowance, but before payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
  - ☐ Promptness Certificate;
  - ☐ Petition for Consideration; and

- \_\_\_\_ Check No. in the amount of \$ \_\_\_\_\_ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).
- IV. \_\_\_\_ After payment of the Issue Fee. Accordingly, in order to secure consideration thereof, each of the following are also enclosed:
- \_\_\_\_ Petition to Withdraw from Issue; and
- \_\_\_\_ Check No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ constituting the petition fee set forth in 37 C.F.R. § 1.17(i)(1).

C. Fees

The Commissioner is hereby authorized to charge payment of or any deficiency in the following fees associated with this communication, or to credit any overpayment thereof, to Deposit Account No. 23-3178. A duplicate copy of this letter is enclosed.

- X Any fee required in relation to filing of this letter or any documents transmitted therewith.
- \_\_\_\_ The submission fee set forth in 37 C.F.R. § 1.17(p) in the event that 37 C.F.R. § 1.97(c) applies and the Examiner is not satisfied that any Promptness Certificate submitted meets the requirements of 37 C.F.R. § 1.97(e).
- \_\_\_\_ The submission fee set forth in 37 C.F.R. § 1.17(p).
- \_\_\_\_ The petition fee set forth in 37 C.F.R. § 1.17(i)(1).

Dated this 12<sup>th</sup> day of March 2004.

Respectfully submitted,



DANA L. TANGREN  
Attorney for Applicant  
Registration No. 37,246  
Customer No. 022913



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	Shin Kamei et al.	)
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Serial No.:	10/715,146	) Art Unit
		) 2874
Filed:	November 17, 2003	)
		)
Confirmation No.:	1904	)
		)
For:	OPTICAL WAVEGUIDE CIRCUIT	)

INFORMATION DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.97

Commissioner for Patents  
PO Box 1450  
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof is also enclosed.

Statement of Relevance of References Listed  
Unaccompanied by English Translation  
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

Japanese Patent No. 63-33706: PURPOSE: to suppress the radiation loss by continuously changing the refractive index distribution in the axial direction while keeping the normalized frequency of a fibrous element, which consists of a core layer and a cladding layer, approximately constant.

CONSTITUTION: A fiber type optical wave circuit element consists of a core layer and a cladding layer, and the cross section of the core layer in both ends has about circular symmetrical shape, and the normalized frequency is kept approximately constant between both ends and the refractive index distribution is so set that the electromagnetic field distribution is continuously spread in the axial direction. Consequently, the incident optical wave from one end keeps the peculiar mode while suppressing the radiation loss during propagation and reaches the other end. If the cross section shape of the core layer in both ends is set in accordance with the electromagnetic field distribution of the optical wave circuit element connected to both ends, the radiation loss accompanied with mismatching of the electromagnetic field distribution due to connection is suppressed.

Japanese Patent No. 10-300957: PROBLEM TO BE SOLVED: to optically couple a bulk type optical element, an optical fiber, an optical active element such as a semiconductor laser and other waveguide type parts simply with a low loss by specifying a gap width by a specified inequality.

SOLUTION: An optical waveguide K2 is provided with one and more gap parts in which an optical element is packaged in the direction crossing a waveguide core between a light entrance end part and a light exit end part. The gap width of the gap part satisfies  $G < 0.32\pi n\omega <2> / \lambda$ , where  $\lambda$ : the wavelength of a waveguide length,  $n$ : refractive index of optical element,  $\omega$ : the mode field radius of waveguide light. Otherwise, at least one of the gap parts satisfies  $0.9675 <(1 + ((\lambda G) / 2\pi n\omega <2> )) <2> > -1>$ , where,  $\lambda$ : the wavelength of a waveguide length,  $G$ : gap width,  $n$ : the refractive index of the gap part,  $\omega$ : the mode field radius of waveguide light. By arranging plural gap parts, the coupling loss is suitably decreased compared with the case that one gap width equal to the sum of the plural gap widths is provided.

Japanese Patent No. 11-97784: see U.S. Patent No. 6,320,888.

Japanese Patent No. 2000-29079: PROBLEM TO BE SOLVED: To save power of a waveguide type optical switch.


SOLUTION: The thermo-optical switch of a Mach-Zehnder type consists of two directional couplers formed by bringing two waveguides into proximate to each other on a substrate, two arm

waveguides connecting these directional couplers and a thin-film heater for shifting the phase of propagation light by imparting a thermo-optical effect to these arm optical waveguides. A groove for imparting the thermo-optical effect to these arm optical waveguides is arranged in at least mid-way of the arm optical waveguides to be imparted with the thermo-optical effect. An organic material having a thermo-optical constant larger than the thermo-optical constant of the arm optical waveguides to be imparted with the thermo-optical effect is filled into this groove.

PCT Application No. WO 98/36299: an optical waveguide circuit includes a plurality of waveguides with different length. Grooves are formed in the waveguide by removing the upper cladding and the core of the waveguide or by removing the upper cladding, the core and the lower cladding of the waveguide, and filled with a material which have a refractive index temperature coefficient whose sign is different from the temperature coefficient of the effective refractive index of the waveguide. The difference between the lengths of the removed parts of the adjacent waveguides is proportional to the difference between the lengths of the remaining parts of the adjacent waveguides.

Dated this 12<sup>th</sup> day of March 2004.

Respectfully submitted,



Dana L. Tangren  
Attorney for Applicant  
Registration No. 37,246  
Customer No. 022913

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Applicant: Shin Kamei et al.

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Serial No.: 10/715,146

Att'y Docket No.: 14321.59

Filing Date: November 17, 2003

Group: 2874

For: OPTICAL WAVEGUIDE CIRCUIT

INFORMATION DISCLOSURE CITATIONS MADE BY APPLICANTU.S. Patent Documents

Examiner Initial*	Document Number	Issue Date	Name
_____ 1	6,304,687 B1	10/16/2001	Inoue et al.
_____ 2	6,320,888 B1	11/20/2001	Tanaka et al.

Foreign Patent Documents

Examiner Initial*	Document Number	Publication Date	Country or Patent Office	Translation
_____ 3	0 919 840 A1	06/02/1999	EPO	N/A
_____ 4	63-33706	02/13/1988	Japan	No
_____ 5	10-300957	11/13/1998	Japan	No
_____ 6	11-97784	04/09/1999	Japan	No
_____ 7	2000-29079	01/28/2000	Japan	No
_____ 8	WO 98/36299	08/20/1998	PCT	No

Other Documents

(including author, title, pertinent pages, etc.)

Examiner  
Initial\*

_____ 9	H. Takahashi et al., <i>Arrayed-Waveguide Grating for Wavelength Division Multi/Demultiplexer with Nanometre Resolution</i> , Electronics Letters, Vol. 26, No. 2, January 1990, pp. 87-88.
_____ 10	M. Okuno et al., <i>8 X 8 Optical Matrix Switch Using Silica-Based Planer Lightwave Circuits</i> , IEICE Trans. Electron, Vol. E76-C, No. 7, July 1993, pp. 1215-1223.

Examiner:

Date Considered:

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Form PTO-1449

Applicant: Shin Kamei et al.  
Serial No.: 10/715,146  
Filing Date: November 17, 2003  
For: OPTICAL WAVEGUIDE CIRCUIT



Sheet 2 of 2  
Confirmation No.: 1904  
Att'y Docket No.: 14321.59  
Group: 2874

- \_\_\_\_ 11 T. Tanaka, et al., *Integrated External Cavity Laser Composed of Spot-Size Converted LD and UV Wirtten Grating in Silica Waveguide in Si*, Electronics Letters, Vol. 32, No. 13, June 1996, pp. 1202-1203.
- \_\_\_\_ 12 S. Suzuki et al., *High-Density Integrated Planar Lightwave Circuits Using SiO<sub>2</sub>-GeO<sub>2</sub> Waveguides with a High Refractive Index Difference*, Journal of Lightwave Technology, Vol. 12, No. 5, May 1994, pp. 790-796, May 1994.
- \_\_\_\_ 13 Shin Kamei et al., *Loss Reduction in Super-high-Δ Compact Athermal AWG*, Proceedings of the 2003 IEICE Society Conference, September 10, 2003, pp. 145 (with English translation).

### References Cited by Applicants

While the filing of Information Disclosure Statements is voluntary, the procedure is governed by the guidelines of Section 609 of the Manual of Patent Examining Procedure and 37 C.F.R. §§ 1.97 and 1.98. To be considered a proper Information Disclosure Statement, Form PTO-1449 shall be accompanied by a copy of each listed patent or publication or other item of information and a translation of the pertinent portions of foreign documents (if an existing translation is readily available to the applicant), an explanation of relevance of each reference not in the English language, and should be submitted in a timely manner as set out in MPEP Sec. 609.

Examiners will consider all citations submitted in conformance with 37 C.F.R. § 1.98 and MPEP Sec. 609 and place their initials adjacent the citations in the spaces provided on this form. Examiners will also initial citations not in conformance with the guidelines which may have been considered. A reference may be considered by the Examiner for any reason whether or not the citation is in full conformance with the guidelines. A line will be drawn through a citation if it is not in conformance with the guidelines AND has not been considered. A copy of the submitted form, as reviewed by the Examiner, will be returned to the applicant with the next communication. The original of the form will be entered into the application file.

Each citation initialed by the Examiner will be printed on the issued patent in the same manner as references cited by the Examiner on Form PTO-892.

The reference designations "A1," "A2," etc. (referring to Applicant's reference 1, Applicant's reference 2, etc.) will be used by the Examiner in the same manner as Examiner's reference designations "A," "B," "C," etc. on Office Action Form PTO-1142.

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Examiner:

Date Considered:

**\*EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609, draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.